

REMARKS

This Amendment and the accompanying Request for Continued Examination are being filed responsive to the November 2, 2004 final Office action that was issued in connection with the above-identified patent application. Claims 1-21, 23-44, and 47-58 are presently pending and stand rejected. By the above amendments, claims 1, 8, 15, 17, 23, 26, and 55 are amended, and claim 30 is cancelled without prejudice. The amendments of claims 8, 15, 17, 23, 26, and 55, and the cancellation of claim 30 are to correct informalities and typographical errors that were not detected in Applicants' response to the first Office action.

In the Office action, claims 1-3, 5, 7, 9-12, 15-17, 19-21, 23-25, 32-33, 48, and 54-57 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,988,580 to Ohsaki et al. ("Ohsaki"). The remaining claims were rejected under 35 U.S.C. § 103(a) as being obvious over Ohsaki alone or in combination with other references. Specifically, claims 6, 8, 13-14, 26-28, and 30-31 were rejected as being obvious over Ohsaki alone. Claims 4, 47, and 58 were rejected as being obvious over Ohsaki in view of U.S. Patent No. 5,900,031 to Bloomfield ("Bloomfield"). Claims 34-44 were rejected as being obvious over Ohsaki in view of U.S. Patent No. 6,522,955 to Colborn ("Colborn"). Claims 49-53 were rejected as being obvious over Ohsaki in view of U.S. Patent No. 6,666,961 to Skoczylas et al. ("Skoczylas"). Claim 18 was rejected as being obvious over Ohsaki in view of U.S. Patent Application Publication No. 2002/0041986 to Wojtowicz et al. ("Wojtowicz"). Claims 27 and 29 were rejected as being obvious over Ohsaki in view of U.S. Patent No. 6,686,078 to Jones ("Jones").

Applicants have studied the cited references in view of the pending claims and the reasons expressed in the Office action. Applicants respectfully disagree that the subject matter of all of the original claims was anticipated or rendered obvious by the cited references. However, Applicants have amended claim 1 to recite subject matter that is neither disclosed nor suggested in the cited references, individually or in any permitted combination thereof. Applicants request continued examination of the present application, and reconsideration of the rejections, for at least the reasons discussed below. In the following discussion, Applicants first discuss the amendment to independent claim 1, from which all of the remaining claims depend. Applicants then discuss representative ones of the claims that depend from claim 1 to present illustrative additional reasons why these claims are believed to recite subject matter that is neither disclosed nor suggested in the cited references. Applicants believe that this format may reduce the Examiner's time considering this response, in that all pending claims should be allowable upon allowance of amended claim 1.

Amended Claim 1

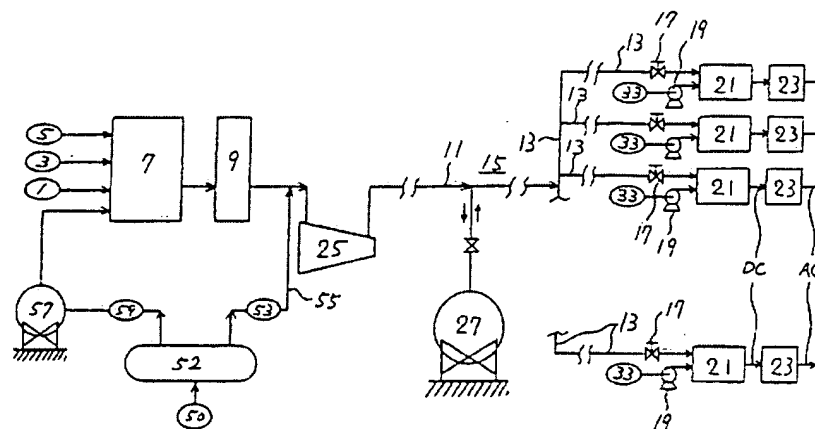
Claim 1 has been amended to recite, amongst other subject matter, a fuel cell system with a fuel processor that produces a product hydrogen stream, a hydrogen storage system that includes a mechanical compressor that compresses and stores under pressure at least a portion of the product hydrogen stream, and a fuel cell stack that is selectively adapted to simultaneously receive hydrogen gas that has been compressed by the mechanical compressor and hydrogen gas that has not been not previously compressed by the mechanical compressor, and to produce an electric current therefrom. As discussed in the present specification, a fuel cell system in which the fuel cell stack

may selectively receive hydrogen gas from the fuel processor, from the hydrogen storage system, or both, enables a range of operating configurations that provides a more flexible, adaptable system. A potential benefit of the configuration recited in amended claim 1 is that the entire product hydrogen stream does not need to be compressed by the mechanical compressor after being produced by the fuel processing assembly. Instead, some of the product hydrogen stream may be consumed by the fuel cell stack without having been compressed by the mechanical compressor, while some of the product hydrogen stream may be compressed by the mechanical compressor and stored in the hydrogen storage device. The energy and efficiency savings of such a system over the system of Ohsaki may be considerable, as discussed in more detail below.

Applicants agree with the Examiner that Ohsaki discloses a fuel cell system in which one or more fuel cell stacks receive hydrogen gas from a fuel processor, with the fuel cell system including a compressor that compresses the product hydrogen stream and a hydrogen storage device that stores some of the compressed hydrogen gas. However, Ohsaki does not disclose or suggest a fuel cell stack that is adapted to simultaneously receive hydrogen gas previously compressed by a mechanical compressor and hydrogen gas that has not been previously compressed by the mechanical compressor, as recited in amended claim 1. Instead, Ohsaki requires that the entire product hydrogen stream be compressed by a compressor, with some of the compressed gas stream being delivered to the fuel cell stack and some of the compressed gas stream being stored in a hydrogen storage device. The disclosure of Ohsaki is discussed below to point out this distinction, including the fact that the system of Ohsaki teaches away

from the subject matter recited in amended claim 1 and would be rendered inoperable if modified to provide the recited configuration.

Ohsaki discloses a single configuration of a fuel cell system, which is reproduced below for the Examiner's convenience.



With reference to the above Figure, the system of Ohsaki includes fuel cell stacks (21) that are supplied with hydrogen gas from a fuel processor 7 and a storage device in the form of a tank 27. The storage tank is charged with compressed hydrogen gas that is produced by the fuel processor 7. However, as is clearly depicted in the Figure of Ohsaki, the entire product hydrogen stream is compressed by compressor 25. Thereafter, some of the compressed hydrogen gas is stored in tank 27 and some of the compressed hydrogen gas is delivered to fuel cell stacks 21. Accordingly, it follows that the system of Ohsaki does not disclose or suggest supplying hydrogen gas which has been compressed, and hydrogen gas which has not been compressed, to the fuel cell stacks.

In fact, Ohsaki teaches away from the subject matter recited in amended claim 1 when it discusses storing the entirety of the produced hydrogen gas as a

pressurized gas in an extensive network of supply piping. Ohsaki notes that its disclosed invention “distributes the hydrogen gas through piping [and] stores the surplus gas in the piping” (column 2, lines 29-32) and that “[a]ccording to the present invention, the piping for supplying hydrogen gas serves as a buffer tank for storing surplus hydrogen gas as well as means for distributing hydrogen gas.” (column 4, lines 42-45). Coupled with Ohsaki’s disclosure that the fuel cell system is designed to provide hydrogen gas for delivery under pressure across great distances, such as 50 km or more, it follows that modifying the system of Ohsaki to only pressurize a portion of the product hydrogen stream with compressor 25 would be contrary to the specific requirements and disclosure of the reference.

For at least the above reasons, Applicants believe that a fuel cell stack adapted to simultaneously receive hydrogen gas previously compressed by a mechanical compressor and hydrogen gas not previously compressed by the mechanical compressor patentably distinguishes Ohsaki. As such, and upon consideration of amended claim 1, Applicants request that the rejections of claim 1 be withdrawn.

Claims 2-21, 23-44 and 47-58

All of the remaining claims depend from amended claim 1 and therefore should be allowed when amended independent claim 1 is allowed. For the purpose of brevity, each of these dependent claims is not discussed in detail and each additional reason why these claims are believed to patentably distinguish the cited references is not presented. However, Applicants want to briefly discuss a few of these dependent claims and to present illustrative additional reasons why the claims should be allowed.

Claim 6 depends from claim 1 and recites that the fuel processor, the fuel cell stack and the hydrogen storage system are integrated together in a common housing. Claim 8 recites that the fuel processor, the fuel cell stack and at least one energy-consuming device are integrated at least partially within a common housing. Ohsaki does not disclose or suggest a fuel cell system with a hydrogen storage system and an integrated housing, much less an integrated housing at least partially containing a fuel cell system with the operative configuration recited in amended claim 1. In the Office action, claims 6 and 8 are rejected as being obvious over Ohsaki on the grounds that it would have been obvious to place the system of Ohsaki at least partially or completely within a common housing. However, Applicants respectfully submit that it is not obvious to place the Ohsaki system into a common housing to get the system recited in claims 6 or 8. For example, Ohsaki recites that “[t]he fuel cell power generating system includes piping of 50 km in total length...capable of storing approximately 350,000 Nm³...hydrogen gas” (column 6, line 65 – column 7, line 1). Also, Ohsaki notes “[t]he hydrogen-generating plant is sited in the coastal region where the fuel source, such as natural gas, is readily available [and] the fuel cell power generating units are distributed in the city and the inland points of power demand” (column 7, lines 3-7). In short, Ohsaki discloses a system of much greater scale than could reasonably be integrated into a common housing. For at least this reason, Applicants submit that claims 6 and 8 should be allowed.

Claims 34-44 depend from claim 21 and recite that the fuel cell system of claim 1 includes a controller adapted to selectively control the distribution of hydrogen gas in the fuel cell system under various conditions and while monitoring a number of

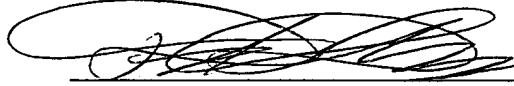
possible inputs. In the Office action, Ohsaki and Colborn are cited for disclosing the use of a computerized controller in the fuel cell system. In particular, Colborn discloses a system and method for power management, including a communication device, a display, user input, memory, and a wired or wireless linkage. However, Applicants submit that using the controller of Colborn in the disclosed system of Ohsaki does not teach or suggest Applicants' controlled fuel cell system. For example, claim 24 (from which claims 34-36 depend, via claim 33) recites that the controller is adapted to monitor one or more operating parameters of the fuel cell system and to selectively regulate the delivery of the product hydrogen stream to the hydrogen storage system and to the fuel cell stack at least partially in response to those parameters. As such, the controller may need to be adapted to selectively regulate the operation of the mechanical compressor, for example, in response to signals indicating that the hydrogen storage device needs to be re-pressurized with compressed hydrogen gas (specification, pg. 24, line 18 – pg. 25, line 6). Ohsaki does not disclose a configuration where a similar control operation may be performed, simply through the addition of the appropriate controller, because the Ohsaki configuration does not provide for selectively compressing a portion of the product hydrogen gas stream to refill a hydrogen storage system. For at least this additional reason, Applicants submit that claims 34-44 should be allowed.

With the entry of the above amendments, and for the reasons discussed herein, Applicants submit that all of the issues raised in the final Office action have been addressed and overcome. If there are any remaining issues or if the Examiner has any questions, Applicants' undersigned attorney may be reached at the number listed below. Similarly, if the Examiner believes that a telephone interview may be productive in

advancing prosecution of the present application, the Examiner is invited to contact Applicants' undersigned attorney at the number listed below.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "David S. D'Ascenzo", is written over a horizontal line.

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